

**WHAT IS CLAIMED IS:**

**CLAIMS**

1. An efficient fluid cleaning system comprising:
  - first means for changing the pressure of a fluid from a first pressure to a second pressure, said second pressure lower than said first pressure and
  - second means for distributing said fluid within an evaporation chamber at said second pressure, said evaporation chamber including an evaporation surface having capillary channels for dispersing oil about said evaporation surface via capillary action to facilitate evaporation of contaminants from within said fluid.
2. The system of Claim 1 wherein said second means includes means for employing siphoning action to disperse said fluid about said evaporation surface when said efficient fluid cleaning system is installed at an angle so that said evaporation chamber is angled.
3. The system of Claim 2 wherein said evaporation chamber includes substantially parallel or cylindrical walls to maximize fluid circulation out the system and to maximize the compactness of the fluid cleaning system, and wherein said evaporation surface is contoured to promote dripping from edges of the contours to enhance effective evaporation surface area via the surfaces of resulting fluid drops.
4. The system of Claim 1 wherein said capillary channels are spiral capillary channels and wherein said fluid cleaning system further includes a vent for venting said contaminants through a ceiling of said evaporation chamber.

5. The system of Claim 4 wherein said vent includes a valve biased in an open position and lacking a cracking pressure, said valve preventing the escape of said fluid from said system, and wherein said evaporation surface includes polygon-shaped perforations therein for allowing said fluid to pass radially through walls of said chamber and onto said evaporation surface, said perforations distributed in at least two dimensions relative to said evaporation surface.

6. The system of Claim 5 further including a housing, a filter disposed therein, said evaporation chamber surrounded by said filter, said filter disposed within said housing so that a space exists between said filter and said housing wherein said fluid can circulate, and further including fourth means for draining said clean fluid from said evaporation chamber via a drain extending through a base of said evaporation chamber, and wherein said fluid cleaning system lacks a built-in heater.

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7. The system of Claim 4 wherein said capillary channels are partially circular and are sufficiently deep to distribute oil about a circumference of said evaporation chamber when said fluid cleaning system and said evaporation chamber are in a near horizontal position.

8. The system of Claim 1 further including means for squirting said fluid within said evaporation chamber to enhance effective evaporation surface area.

9. The system of Claim 8 wherein said means for squirting further including means for causing cavitation of said contaminants to facilitate evacuation of said contaminants from said system.

10. The system of Claim 9 wherein said means for causing cavitation includes one or more cavitation jets opening into said evaporation chamber, said one or more cavitation jets including funnel portions for accelerating said fluid to create a sufficiently low pressure to cause cavitation of said contaminants.

11. The system of Claim 1 further including an electromagnetic coil disposed about said evaporation chamber, said electromagnetic coil acting as both a heater and an electromagnet, and wherein said fluid cleaning system includes additional channels that maintain said metallic contaminants when said electromagnetic coil is not powered.

12. An efficient fluid cleaning system comprising:

first means for changing the pressure of a fluid from a first pressure to a second pressure, said second pressure lower than said first pressure and sufficient to cause cavitation of contaminants in said fluid and

5 second means for distributing said fluid within an evaporation chamber at said second pressure via one or more capillary channels to facilitate evaporation of contaminants within said fluid.

13. The system of Claim 12 wherein said evaporation chamber includes an evaporation surface that is at least partially surrounded by both an electromagnetic coil and a mesh for increasing the rate of evaporation of contaminants from said evaporation surface area of said evaporation chamber.

14. An efficient evaporation surface for a mobile oil recycling system comprising:

a surface contour for expanding the surface area of said evaporation surface over that of a substantially flat surface by at least five percent, said surface contour having

perforations therein for allowing oil to pass therethrough and onto said evaporation  
5 surface and

capillary channels at various positions along said surface contour for distributing  
oil about said evaporation surface.

15. An efficient fluid cleaning system comprising:

first means for changing the pressure of a fluid from a first pressure to a second  
pressure, said second pressure lower than said first pressure and sufficient to cause  
cavitation of contaminants in said fluid;

5 second means for distributing said fluid within an evaporation chamber at said  
second pressure via one or more spiral capillary channels and one or more cavitation jets  
to facilitate evaporation of contaminants within said fluid;

an electromagnetic coil for simultaneously heating said evaporation chamber and  
removing metallic particles from circulation within said fluid; and

10 a filter for removing solid contaminants from said fluid, said filter surrounding said  
evaporation chamber; and

a space between an oil inlet and said filter to facilitate distribution of fluid about  
one or more input surfaces of said filter.

16. An efficient oil recycling system comprising:

a base plate having an oil inlet and a threaded protruding section concentric with  
said base plate;

5 a filter having a filter housing with a housing base that has a female threaded  
section therein for mating with said threaded protruding section of said base plate;

a seal for sealing said filter housing base to said base plate and creating a sealed  
space between said filter housing and said base plate so that oil flows from said oil inlet  
into said space and then into said filter via perforations in said filter base; and

an evaporation chamber within said filter, said evaporation chamber in  
10 communication with an oil outlet and a vent, said evaporation chamber having a three-dimensional surface that has an open end or radial holes therethrough for allowing filtered oil to pass from said filter and onto three-dimensional surface.

17. The system of Claim 16 wherein said vent extends through a ceiling of said housing to the atmosphere; wherein said oil outlet extends through said filter housing opposite to said vent; wherein said oil outlet passes through said base plate concentric with said threaded protruding section; and wherein said filter housing and said filter are  
5 part of a spin-on filter, said spin-on filter having a pre-existing interior hollow section wherein said evaporation chamber is formed.

18. The system of Claim 16 wherein said evaporation chamber includes an evaporation attachment that protrudes within an interior of said filter housing, said evaporation attachment having said three-dimensional evaporation surface, said attachment having an open end over which filtered may flow onto said evaporation surface, and wherein said evaporation attachment includes a threaded tube having threads on the interior of said tube for providing grooves for expanding the surface area of oil within said chamber, and wherein said threads facilitate attachment of said evaporation attachment to said base plate.  
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19. An efficient oil recycling system comprising:  
a housing having an end cap, a base, and a filter disposed therein;  
an oil inlet in said base, said oil inlet opening into a space in a center of said filter,  
said space defining an input surface of said filter;

5           a concentric space between an output surface of said filter and an outer wall of  
said housing, said concentric space representing an evaporation chamber, said output  
surface an evaporation surface;

          a vent in said end cap, said vent in communication with said concentric space, and  
said end cap securing said filter within said housing against said base; and

10           an oil outlet in said base, said oil outlet in communication with said concentric  
space.

20. The system of Claim 18 wherein said evaporation surface includes various  
channels therein for maximizing the surface area of said evaporation surface by promoting  
capillary action dispersion of said oil on said evaporation surface, and wherein said  
evaporation surface includes a contour over which said oil may flow to increase the travel  
5           length of said oil over said evaporation surface, and wherein said base includes a groove  
or channel that varies in depth within said concentric space and is deepest at said oil outlet  
so that oil draining from said evaporation surface is directed to said outlet via said groove.